<u>What is Claimed is:</u>

1   1. An apparatus for de-interleaving the interleaved data in a coded orthogonal frequency

2   division multiplexing receiver, comprising:

3   a de-interleaving memory for de-interleaving said interleaved data; and

4   a controller for generating the correct access addresses of said de-interleaving

5   memory for the data to be de-interleaved, and controlling the read and write

6   operations to said de-interleaving memory.

1   2. The apparatus for de-interleaving the interleaved data in a coded orthogonal

2   frequency division multiplexing receiver as claimed in claim 1, wherein said

3   controller further comprises an address generator having a plurality of base address

4   generators and a read/write control circuitry.

1   3. The apparatus for de-interleaving the interleaved data in a coded orthogonal

2   frequency division multiplexing receiver as claimed in claim 2, wherein said base

3   address generators further include a segment base address generator, a group base

4   address generator, a sub-group base address generator, and a cell base address

5   generator.

1   4. The apparatus for de-interleaving the interleaved data in a coded orthogonal

2   frequency division multiplexing receiver as claimed in claim 3, wherein each said

3   base address generator includes a pointer that indicates the starting address of the

4   corresponding segment, group, or sub-group, or the address of the corresponding cell.

1   5. The apparatus for de-interleaving the interleaved data in a coded orthogonal

2   frequency division multiplexing receiver as claimed in claim 2, wherein said address

3   generator is implemented by two multiplexers, two multipliers, a divider, a quotient

4   unit, a remainder unit, a look up table, a counter, and two adders.

1   6. A method for de-interleaving the interleaved data in a coded orthogonal frequency

2   division multiplexing receiver, said de-interleaving including frequency de-

3   interleaving, block de-interleaving and time de-interleaving, said method comprising

4   the steps of:

5   (a) generating access addresses of a de-interleaving memory and controlling the read

6   and write operations for said interleaved data; and

7   (b) de-interleaving said interleaved data in a manner of simultaneously performing

8   said frequency de-interleaving, said block de-interleaving and said time de-

9   interleaving in said de-interleaving memory.

1   7. The method for de-interleaving the interleaved data in a coded orthogonal frequency

2   division multiplexing receiver as claimed in claim 6, wherein said generating access

3   addresses in said step (a) further comprises the steps of:

4   (a1) generating a plurality of base addresses including a segment base address, a

5   group base address, a sub-group base address and a cell address; and

6   (a2) calculating said access address according to said plurality of base addresses.

1   8. The method for de-interleaving the interleaved data in a coded orthogonal frequency

2   division multiplexing receiver as claimed in claim 7, wherein said segment base

3   address in said step (a1) is a pointer that indicates the starting address of a segment,

4   and a segment is defined as the required memory capacity in said de-interleaving

5   memory for de-interleaving an orthogonal frequency division multiplexing symbol.

1   9. The method for de-interleaving the interleaved data in a coded orthogonal frequency

2   division multiplexing receiver as claimed in claim 7, wherein said group base address

3   in said step (a1) is a pointer that indicates the starting address of a group in the

4   current segment, and a group is determined by the total delay units in a cycle to

5   perform said time de-interleaving for said interleaved data.

1   10. The method for de-interleaving the interleaved data in a coded orthogonal frequency

2   division multiplexing receiver as claimed in claim 7, wherein said sub-group base

3   address in said step (a1) is a pointer that indicates the starting address of a sub-group,

4   and a sub-group is defined as a row in said group.

1   11. The method for de-interleaving the interleaved data in a coded orthogonal frequency

2   division multiplexing receiver as claimed in claim 7, wherein said cell address in said

3   step (a1) is a pointer that indicates which cell in said sub-group that the interleaved

4   data is to be written into or read from.

1   12. The method for de-interleaving the interleaved data in a coded orthogonal frequency

2   division multiplexing receiver as claimed in claim 10, wherein said sub-group base

3   address is determined by referring to a look up table that points out the offset from the

4   starting address of said row to the starting address of said group.

1   13. A method for generating an access address of a de-interleaving memory used for a de-

2   interleaving process in a coded orthogonal frequency division multiplexing receiver,

3   comprising the steps of:

4   (a) generating a segment pointer that indicates the starting address of a segment in

5   said de-interleaving memory, wherein a segment is defined as the required

6   memory capacity for de-interleaving an orthogonal frequency division

7   multiplexing symbol;

8   (b) dividing said segment into a plurality of groups, and generating a group pointer

9   that indicates the starting address of a group in said segment, wherein a group is

10   determined by the total delay units in a cycle to perform said time de-interleaving

11   for said interleaved data;

12   (c) generating a sub-group pointer by referring to a look up table, wherein a sub-

13   group is defined as a row in said group and said sub-group pointer indicates the

14   starting address of said sub-group;

15   (d) generating a cell pointer that indicates which cell in said sub-group the interleaved

16   data is to be written into or read from, wherein said cell pointer has an initial

17   value and said initial value is pre-determined; and

18   (e) calculating said access address by summing up said segment pointer, said group

19   pointer, said sub-group pointer and said cell pointer.

1   14. The method for generating an access address of a de-interleaving memory used for a

2   de-interleaving process in a coded orthogonal frequency division multiplexing

3   receiver as claimed in claim 13, wherein said look up table points out the offset from

4   the starting address of said row to the starting address of said group.